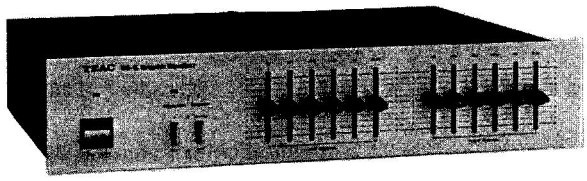
TEAC®



SERVICE MANUAL

GE-6

Graphic Equalizer

Effective: January 1982

5704011600

SPECIFICATIONS

Control Frequencies	40, 125, 400, 1.25k, 4k, 12.5k Hz
Control Range	± 12dB
Output Level/Impedance	4 V/2.2kohms (Max.) 1 V/2.2kohms (Rated)
Total Harmonic Distortion	0.01 %
Signal-To-Noise Ratio	100 dB (IHF A)
Input Impedance	80 kohms
Frequency Response	10 Hz–30 kHz ± 1dB
Power Requirements	110–120/220–240 V AC 50/60 Hz (General export models) 120 V AC 60 Hz (U.S.A./Canada) 220 V AC 50 Hz (Europe) 240 V AC 50 Hz (U. K./Australia)
Power Consumption	10 W
Dimensions (W x H x D)	432 x 95 x 326mm (17" x 3-3/4" x 12-13/16")
Weight	5 kg (11 lbs) net
Standard Accessory	Input-output connection cord x 2

- Improvements may result in specifications or features changing without notice.

NOTES

1. ⚠ Parts marked with this sign are safety critical components. They must always be replaced with identical components - refer to the appropriate parts list and ensure exact replacements.
2. PC board shown viewed from foil side.

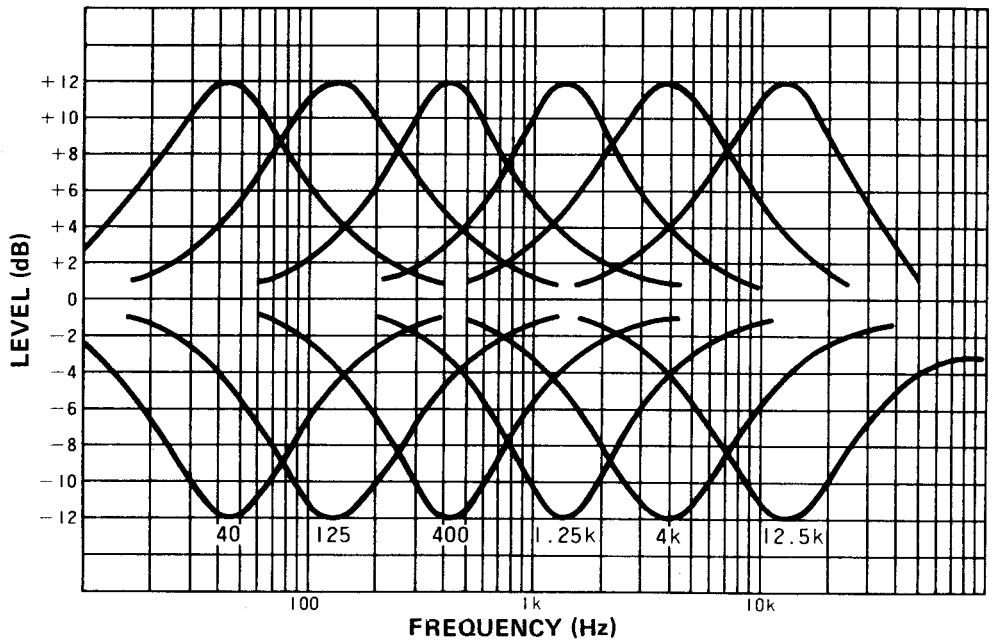


Fig. 1 Frequency Response

CIRCUIT DESCRIPTION

Simulated Inductive Device

GE-6 boosts or cuts the input signal and outputs for each of the frequency points 40Hz, 125Hz, 400Hz, 1250Hz, 4000Hz and 12500Hz.

In the case when a certain frequency decreases or increases depending on the above levels, generally the characteristic of resonance of the coil and the capacitor is used. But considering each frequency point, for lower frequencies the capacity of the capacitor and the inductance of the coil needed becomes too large to be instrumented. Specially, when the inductance becomes large the external coil size becomes large, so the Q cannot be made to go high or it is affected by interior/external magnetic induction easier and moreover, the cost increases.

So, what was considered, was a simulated inductive device. The above defects were solved and the graphic equalizer, which had been considered for exclusive use in the recording studio before, has now become a popular instrument.

In GE-6, a transistor, resistor and capacitor are combined. This part of the circuit is shown in Figure 2.

Consider R2 as removed from this circuit, the remaining circuit is simply an amplifier with voltage gain 1 (0 dB). This part of the amplifier is marked by a triangle shape, so Figure 2, now becomes Figure 3. The differential circuit and the amplifier are combined, and moreover, positive feedback is passed to R2. Considering the

impedance seen in the amplifier from the input side within the dotted line in Figure 3. the circuit can be shown equivalently of that in Figure 4.
The constants of the equivalent circuit is given in the following formula;

$$L = C_1 R_1 R_2 \ (H)$$

$$Rs = R_2 \ (\Omega)$$

$$Rp = R_1 \ (\Omega)$$

$$Q = (C_1 R_1 R_2 + \omega^2 C_1^2 R_1^2) / [R_1 + (1 + \omega^2 C_1^2 R_1^2) R_2] \omega L$$

$$\omega = 2\pi f$$

As above, the inductance and Q can be varied due to the combination of C_1, R_1 and R_2 and then design can be easily varied according to the various situations.
The following result is shown, by calculating how much the inductance of the equivalent coil (which is used for the circuit constant in GE-6) is;

40 Hz	6.936 (H)
125 Hz	2.244 (H)
400 Hz	0.836 (H)
1250 Hz	0.275 (H)
4000 Hz	0.077 (H)
12500 Hz	0.022 (H)

(H) . . . . . Henry; unit for the inductance.

The 40Hz-use-circuit has an approximate 7 (H) value, but if an ordinary coil is used, the external size becomes very large and it will probably be larger than the power transformer used in GE-6. In such a case, Q "simulated inductive device" has the advantage.

Examine Figure 1 again. Any further explanation is no longer required, but the equivalent coils with in the dotted line and C_2, compose the combined resonance capacitor. Therefore, this circuit is the series resonance circuit. It is generally known that the impedance of the series resonance circuit is minimized by the resonance frequency.

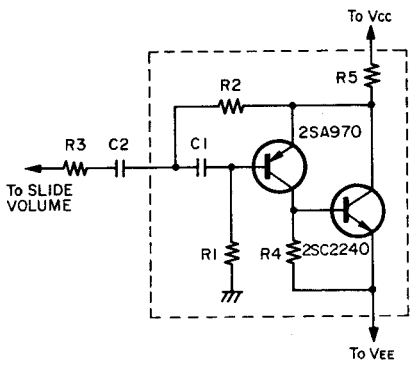


Fig. 2 Actual Circuit

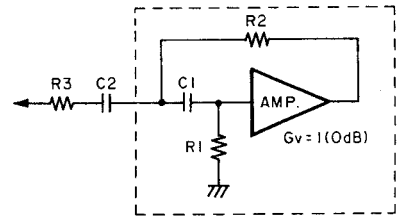


Fig. 3 Block Circuit

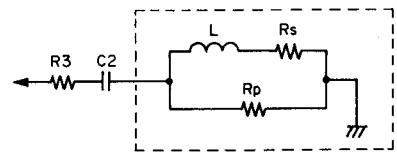


Fig. 4 Equivalent Circuit

Boost or Cut Circuit

This circuit block is shown in Figure 5. The triangle mark shows the amplifier and the operational amplifier IC used in GE-6. The input signal is added to the non-inverting input terminal of the amplifier through resistor R533 (R534) and the inverting input terminal is negative fed back from the amplifier output terminal. Also, the middle tap point of the volume control is made to be grounded.
Supposing that the volume slide control is in the middle point, the resonance circuit is grounded through the middle point of the volume tap, so the resonance circuit does not affect the frequency characteristics. Considering that the volume slide control is shifted forwards the left side in Figure 5, the input signal is grounded through the resonance circuit, and the input signal is attenuated at the resonance frequency of the resonance circuit. The amount of attenuation depends on the position of the volume slide control.
If the volume slide control is shifted towards the right side, the negative feedback signal of the amplifier is grounded through the resonance circuit, and as the amount of the negative feedback is reduced at the resonance frequency point, the gain of the amplifier increases and the input signal boosts at the resonance frequency point. As above, the amount of boost is dependent on the position of the volume slide control.
Furthermore, as these circuit are inserted into the input side of the amplifier, they have the advantage of having a wide dynamic range.

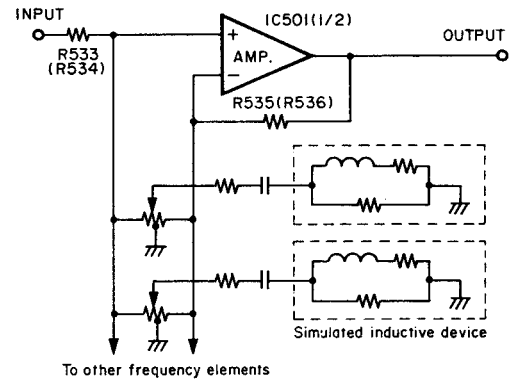
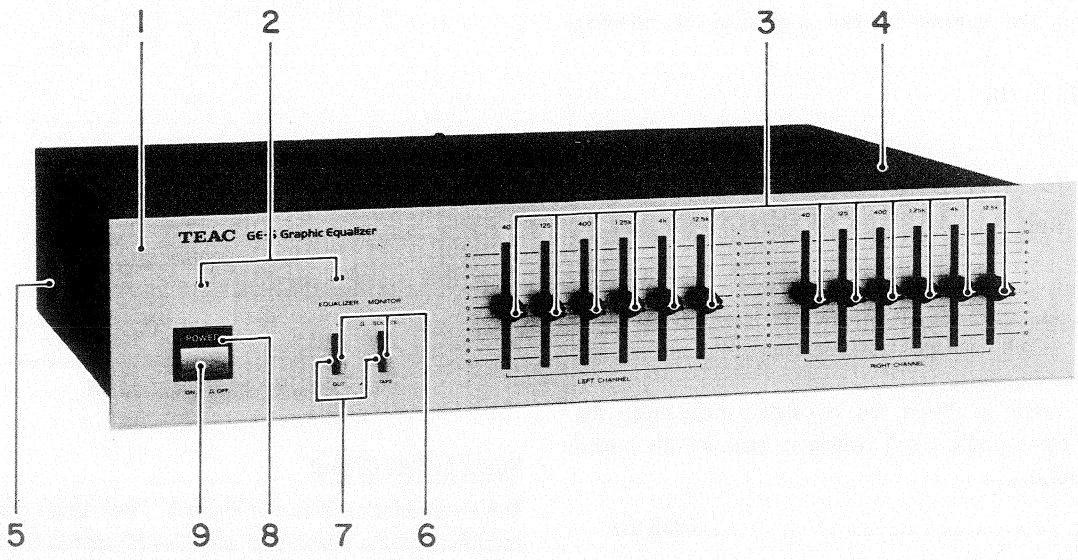


Fig. 5 Boost or Cut Circuit

PARTS LOCATION AND PARTS LIST

PARTS LOCATION-1

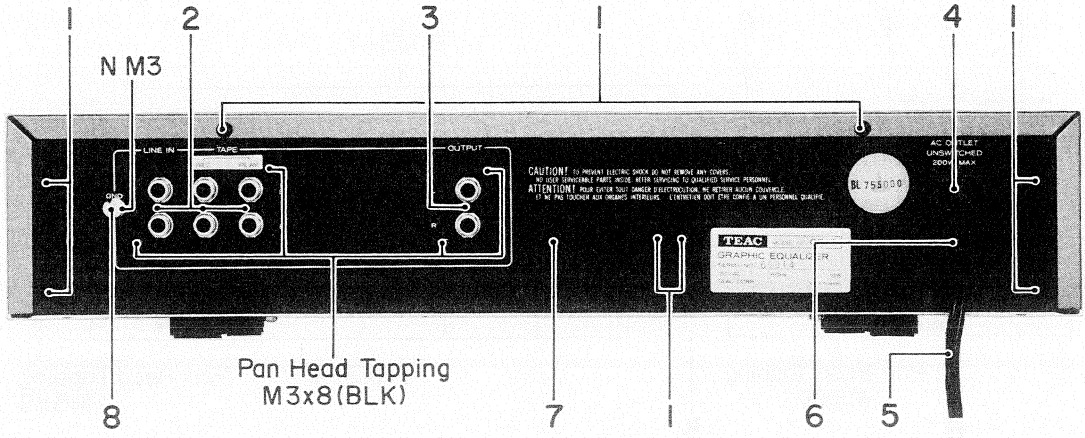


REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
1 - 1	5760137200	Panel, Front	
1 - 2	5760137300	Lens, LED	
1 - 3	6006073000	Knob	GE-20
1 - 4	5760137400	Cover, Top	
1 - 5	5760147600	Screw, M4 x 8 (BLK)	
1 - 6	5760127400	Button, Push	
1 - 7	5760126500	Guide, Button	
1 - 8	5760126400	Guide, Button; Power	
1 - 9	5760127300	Button, Power	

INCLUDED ACCESSORIES

REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
	5700022700	GE-6 Owner's Manual	
	5760124300	Pin Cord x 2	

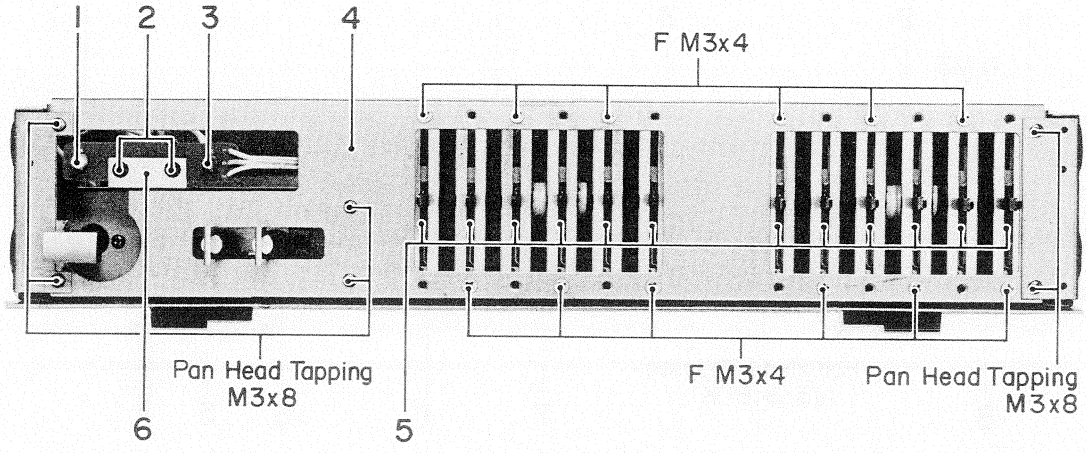
PARTS LOCATION-2



REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
2 - 1	5760147700	Screw, M3 x 8 (BLK)	
2 - 2	5760142000	Pin Jack, 6P	
2 - 3	5760142100	Pin Jack, 2P	
2 - 4	⚠5760137000	Socket, AC Outlet	
2 - 5	⚠5760122700	Cord, AC Power [J, US, C, GE]	
	⚠5760122800	Cord, AC Power [E]	
	⚠5760122900	Cord, AC Power [UK]	
	⚠5760123000	Cord, AC Power [A]	
2 - 6	5760123100	Strain Relief, Cord; 3P-4 [J, US, C, GE]	
	5760123200	Strain Relief, Cord; 4N-4 [E, UK, A]	
2 - 7	5760136800	Panel, Rear [J, US, C, GE]	
	5760136900	Panel, Rear [E, UK, A]	
2 - 8	5760145700	Nut, GND Terminal	

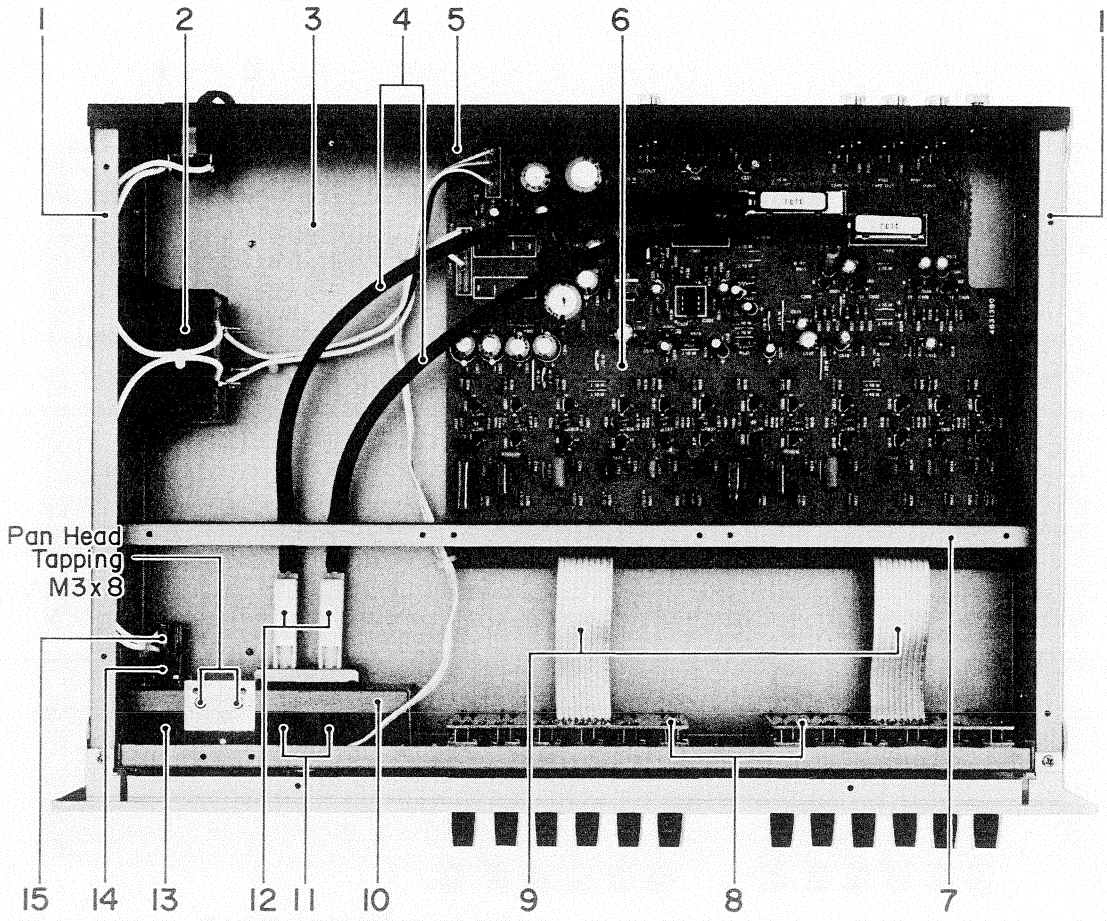
[US]: U.S.A. [C]: CANADA [GE]: GENERAL EXPORT [E]: EUROPE [UK]: U.K.
[A]: AUSTRALIA [J]: JAPAN

PARTS LOCATION-3



REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
3 - 1	5760139300	LED, TLR120 (RED)	
3 - 2	5760147000	Rivet, Push	
3 - 3	5760139400	LED, 113A (GRN)	
3 - 4	5760135600	Plate, Front	
3 - 5	5760139600	Var. Res., Slide; 250kΩ	
3 - 6	5760136700	Holder, LED PCB	

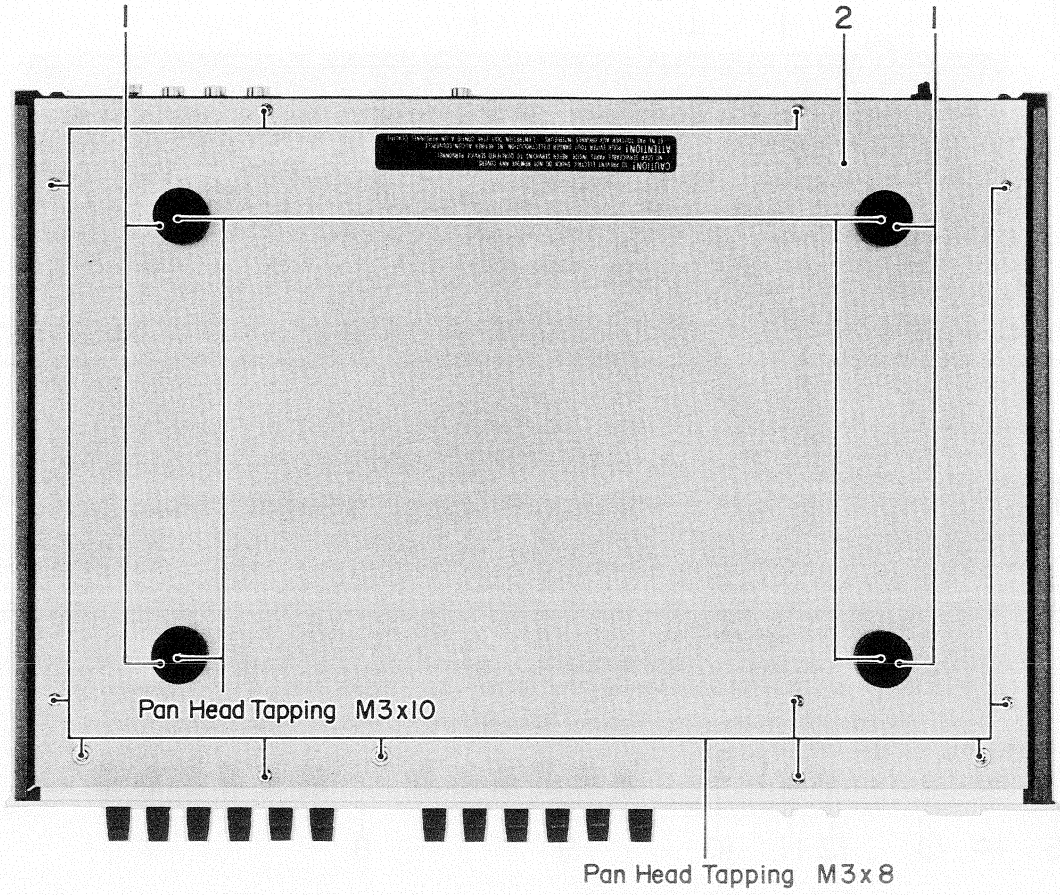
PARTS LOCATION-4



REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
4 - 1	5760135700	Plate, Side	
4 - 2	⚠5760136100	Transformer, Power [US, C]	
	⚠5760136200	Transformer, Power [E, UK, A]	
	⚠5760136300	Transformer, Power [GE]	
4 - 3	5760137500	Cover, Bottom	
4 - 4	5760136600	Wire, Remote	
4 - 5	5760137100	Holder, PCB	
4 - 6	5760137800	PCB Assy, EQ/POWER SUPPLY [All except US, C]	
	5760137810	PCB Assy, EQ/POWER SUPPLY [US, C]	
4 - 7	5760135800	Angle, Center	
4 - 8	5760137900	PCB Assy, SLIDE VR	
4 - 9	5760146300	Wire, Ribbon [J, US, C]	
	5760146400	Wire, Ribbon [GE]	
	5760146500	Wire, Ribbon [E, UK, A]	
4 - 10	5760136400	Angle, Switch	
4 - 11	5760127800	Rod, Switch	
4 - 12	5760136500	Switch, Push; 2-gang	
4 - 13	5760127700	Rod, Power Switch	
4 - 14	⚠5760125900	Switch, Push [J, US, C]	
	⚠5760126000	Switch, Push [GE, E, UK, A]	
4 - 15	⚠5760146800	Spark Killer, 0.0047μF/125V [J, US, C]	
	⚠5760146900	Spark Killer, 0.0047μF/400V [GE, E, UK, A]	

[US]: U.S.A. [C]: CANADA [GE]: GENERAL EXPORT [E]: EUROPE [UK]: U.K.
[A]: AUSTRALIA [J]: JAPAN

PARTS LOCATION-5



REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
5 - 1	5760137600	Foot	
5 - 2	5760137500	Cover, Bottom	

PC BOARD PARTS LIST

EQ/POWER SUPPLY PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	5760137800	PCB Assy [All except US, C]
	5760137810	PCB Assy [US, C]
	5760138000	PCB [All except US, C]
	5760138100	PCB [US, C]
	IC's	
IC501	5147028000	μPC 4558C
IC801	5760139100	TA7324P
	TRANSISTORS	
Q501, Q502	5145153000	2SC2240GR or BL
Q503, Q504	5145162000	2SA970GR
Q601, Q602	5145162000	2SA970GR
Q603, Q604	5145153000	2SC2240
Q605, Q606	5145162000	2SA970GR
Q607, Q608	5145153000	2SC2240
Q609, Q610	5145162000	2SA970GR
Q611, Q612	5145153000	2SC2240
Q613, Q614	5145162000	2SA970GR
Q615, Q616	5145153000	2SC2240
Q617, Q618	5145162000	2SA970GR
Q619, Q620	5145153000	2SC2240
Q621, Q622	5145162000	2SA970GR
Q623, Q624	5145153000	2SC2240
Q801	⚠5760138400	2SC2275
Q802	⚠5760138500	2SA985
	DIODES	
D801~D803	⚠5760138600	ERB12-01
D804	⚠5760138700	W02
ZD801	5760138800	Zener RD16EB3
ZD802	5760138800	Zener RD16EB3
	RESISTORS	
	All resistors are rated ±5% tolerance, ¼ watt and are carbon type unless otherwise noted.	
R501, R502	5181290000	2.2kΩ
R503, R504	5181362000	2.2MΩ
R505, R506	5181362000	2.2MΩ
R507, R508	5181362000	2.2MΩ
R509, R510	5181290000	2.2kΩ
R511, R512	5181346000	470kΩ
R513, R514	5181310000	15kΩ
R515, R516	5181310000	15kΩ
R517, R518	5181300000	5.6kΩ
R519, R520	5181300000	5.6kΩ
R521, R522	5181338000	220kΩ
R523, R524	5181338000	220kΩ
R525, R526	5181250000	47Ω
R527, R528	5181250000	47Ω
R529, R530	5181330000	100kΩ
R531, R532	⚠5181836000	33Ω Nonflammable
R533, R534	5181304000	8.2kΩ
R535, R536	5181304000	8.2kΩ
R537, R538	5181330000	100kΩ
R539, R540	5181290000	2.2kΩ
R541, R542	5181330000	100kΩ
R543, R544	5181330000	100kΩ
R545, R546	⚠5181870000	820Ω Nonflammable

REF. NO.	PARTS NO.	DESCRIPTION
R601, R602	5181284000	1.2kΩ
R603, R604	5181334000	150kΩ
R605, R606	5181294000	3.3kΩ
R607, R608	5181278000	680Ω
R609, R610	5181290000	2.2kΩ
R611, R612	5181284000	1.2kΩ
R613, R614	5181334000	150kΩ
R615, R616	5181278000	680Ω
R617, R618	5181294000	3.3kΩ
R619, R620	5181290000	2.2kΩ
R621, R622	5181284000	1.2kΩ
R623, R624	5181334000	150kΩ
R625, R626	5181278000	680Ω
R627, R628	5181294000	3.3kΩ
R629, R630	5181290000	2.2kΩ
R631, R632	5181284000	1.2kΩ
R633, R634	5181334000	150kΩ
R635, R636	5181278000	680Ω
R637, R638	5181294000	3.3kΩ
R639, R640	5181290000	2.2kΩ
R641, R642	5181284000	1.2kΩ
R643, R644	5181334000	150kΩ
R645, R646	5181278000	680Ω
R647, R648	5181294000	3.3kΩ
R649, R650	5181290000	2.2kΩ
R651, R652	5181290000	2.2kΩ
R653, R654	5181334000	150kΩ
R655, R656	5181278000	680Ω
R657, R658	5181294000	3.3kΩ
R659, R660	5181290000	2.2kΩ
R661, R662	5181290000	2.2kΩ
R801, R802	⚠5185328000	10Ω 1/2W Metal Film
R803, R804	5181360000	1.8kΩ
R805	⚠5185354000	1.2kΩ 1/2W Metal Film
R806	5185344000	470Ω 1/2W Metal Film
R807	5181334000	150Ω
R808	⚠5185356000	1.5kΩ 1/2W Metal Film Nonflammable
R809	5181294000	3.3kΩ
R810	5181350000	680Ω
R811	⚠5185352000	1kΩ 1/2W Metal Film Nonflammable
R812	⚠5181824000	10Ω Nonflammable
	CAPACITORS	
C501	5173394000	Ceramic 0.022μF 50V
C502, C503	5171470000	Elec. 1μF 50V (BP)
C504, C505	5171470000	Elec. 1μF 50V (BP)
C506, C507	5172304000	Ceramic 22pF 50V
C508, C509	5172304000	Ceramic 22pF 50V
C510, C511	5172924000	Elec. 47μF 10V
C512, C513	5173492800	Elec. 10μF 25V (LC)
C514, C515	5172308000	Ceramic 47pF 50V
C516, C517	5172924000	Elec. 47μF 10V
C518, C519	5173492800	Elec. 10μF 25V (LC)
C520, C521	5172924000	Elec. 47μF 10V
C522, C523	5172316000	Ceramic 220pF 50V
C524, C525	5173483800	Elec. 3.3μF 50V (LC)
C526, C527	5173483800	Elec. 3.3μF 50V (LC)
C528, C529	5173394000	Ceramic 0.022μF 50V

[US]: U.S.A. [C]: CANADA [GE]: GENERAL EXPORT [E]: EUROPE [UK]: U.K.
[A]: AUSTRALIA [J]: JAPAN

REF. NO.	PARTS NO.	DESCRIPTION		
C601, C602	5054877800	Mylar	0.01μF	100V
C603, C604	5760141900	Mylar	2.2μF	100V
C605, C606	5054926800	Mylar	0.068μF	100V
C607, C608	5172306000	Ceramic	33pF	50V
C609, C610	5054938800	Mylar	0.68μF	100V
C611, C612	5054898800	Mylar	0.022μF	100V
C613, C614	5172306000	Ceramic	33pF	50V
C615, C616	5054931800	Mylar	0.18μF	100V
C617, C618	5054894800	Mylar	0.0082μF	100V
C619, C620	5172306000	Ceramic	33pF	50V
C621, C622	5054739800	Mylar	0.056μF	100V
C623, C624	5054889800	Mylar	0.0027μF	100V
C625, C626	5172306000	Ceramic	33pF	50V
C627, C628	5054898800	Mylar	0.022μF	100V
C629, C630	5172561000	Polyst.	750pF	50V
C631, C632	5172306000	Ceramic	33pF	50V
C633, C634	5054893800	Mylar	0.0068μF	100V
C635, C636	5172488000	Polyst.	220pF	50V
C637, C638	5172306000	Ceramic	33pF	50V
C801~C804	5172943000	Elec.	220μF	16V
C805, C806	5173394000	Ceramic	0.022μF	50V
C807, C808	5172943000	Elec.	220μF	16V
C809, C810	5172962000	Elec.	470μF	25V
C811	5172890000	Elec.	3.3μF	25V
C812	5054878800	Mylar	0.001μF	100V
C813	5185901000	Elec.	10μF	25V
C814	5185953000	Elec.	330μF	25V
C815	5185901000	Elec.	10μF	25V
C816, C817	⚠5054223000	Ceramic	0.01μF	500V

MISCELLANEOUS

	5760138200	Switch, Slide; 2-2
	5760138300	Switch, Slide; 6-2
	5760142100	Jack, Pin; 2P
	5760142000	Jack, Pin; 6P
	5122432000	Terminal, Lapping; WE4
	5122426000	Terminal, Lapping; WD4
F801, F802	⚠5142229000	Fuse, T200mA
	5142087000	Holder, Fuse (4 used)
	5760139000	Label, Fuse (2 used) [All except US, C]

SLIDE VR PCB ASSY (PC Board omitted)

REF. NO.	PARTS NO.	DESCRIPTION
	5760137900	PCB Assy
	5760139500	PCB
	5760139600	Slide VR, 250kΩ

BLOCK DIAGRAM

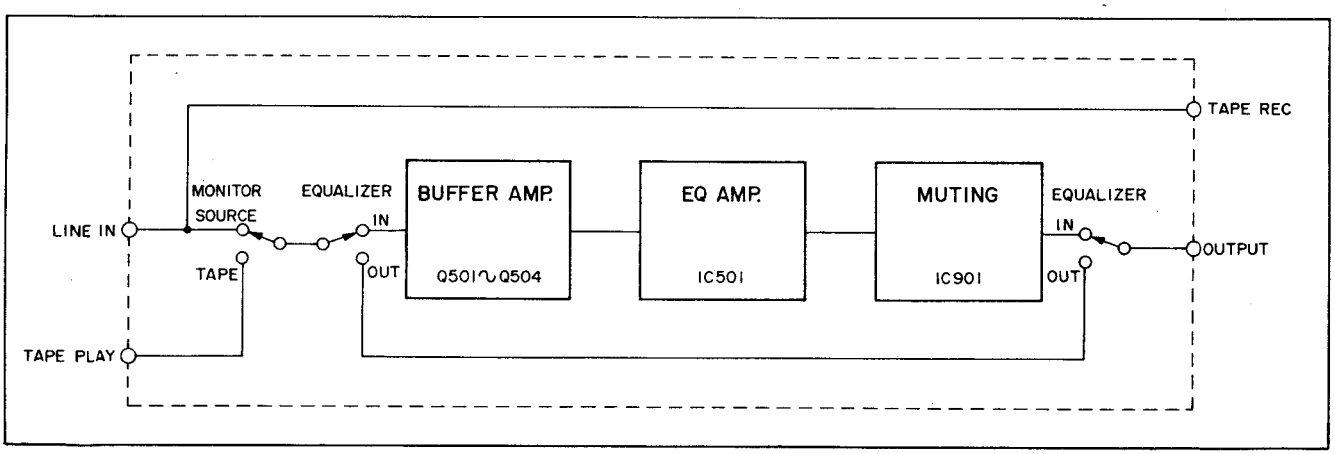
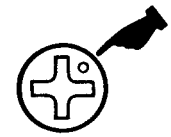


Fig. 6

ASSEMBLING HARDWARE CODING LIST

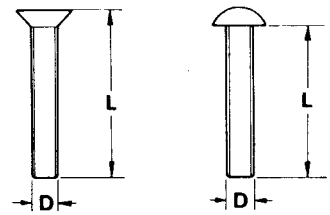
All screws conform to ISO standards, and have crossrecessed heads, unless otherwise noted.
ISO screws have the head inscribed with a point as in the figure to the right.



FOR EXAMPLE:

B M 3 x 6

- B — Nomenclature
- M — Metric System
- 3 — Diameter in mm (D) *
- 6 — Length in mm (L)



* Inner dia. for washers and nuts

	Code	Name	Type
MACHINE SCREW	R	Round Head Screw	
	P	Pan Head Screw	
	T	Stove Head Screw (Truss)	
	B	Binding Head Screw	
	F	Flat Countersunk Head Screw	
	O	Oval Countersunk Head Screw	
WOOD SCREW	RW	Round Head Wood Screw	
TAPTITE SCREW	PTT	Pan Head Taptite Screw	
	WTT	Washer Head Taptite Screw	
SEMS SCREW	BSA	Binding Head SEMS Screw(A Type)	
	BSB	Binding Head SEMS Screw(B Type)	
	BSF	Binding Head SEMS Screw(F Type)	
	PSA	Pan Head SEMS Screw(A Type)	
	PSB	Pan Head SEMS Screw(B Type)	

	Code	Name	Type
TAPPING SCREW	BTA	Binding Head Tapping Screw(A Type)	
	BTB	Binding Head Tapping Screw(B Type)	
	RTA	Round Head Tapping Screw(A Type)	
	RTB	Round Head Tapping Screw(B Type)	
SETSCREW	SF	Hex Socket Setscrew(Flat Point)	
	SC	Hex Socket Setscrew(Cup Point)	
	SS	Slotted Socket Setscrew(Flat Point)	
WASHER	E	E-Ring (Retaining Washer)	
	W	Flat Washer (Plain)	
	SW	Lock Washer (Spring)	
	LWI	Lock Washer (Internal Teeth)	
	LWE	Lock Washer (External Teeth)	
	TW	Trim Washer (Countersunk)	
NUT	N	Hex Nut	

GE-6

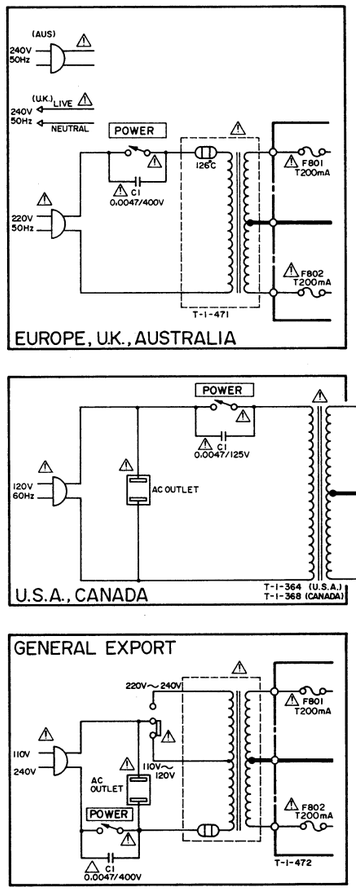
TEAC®

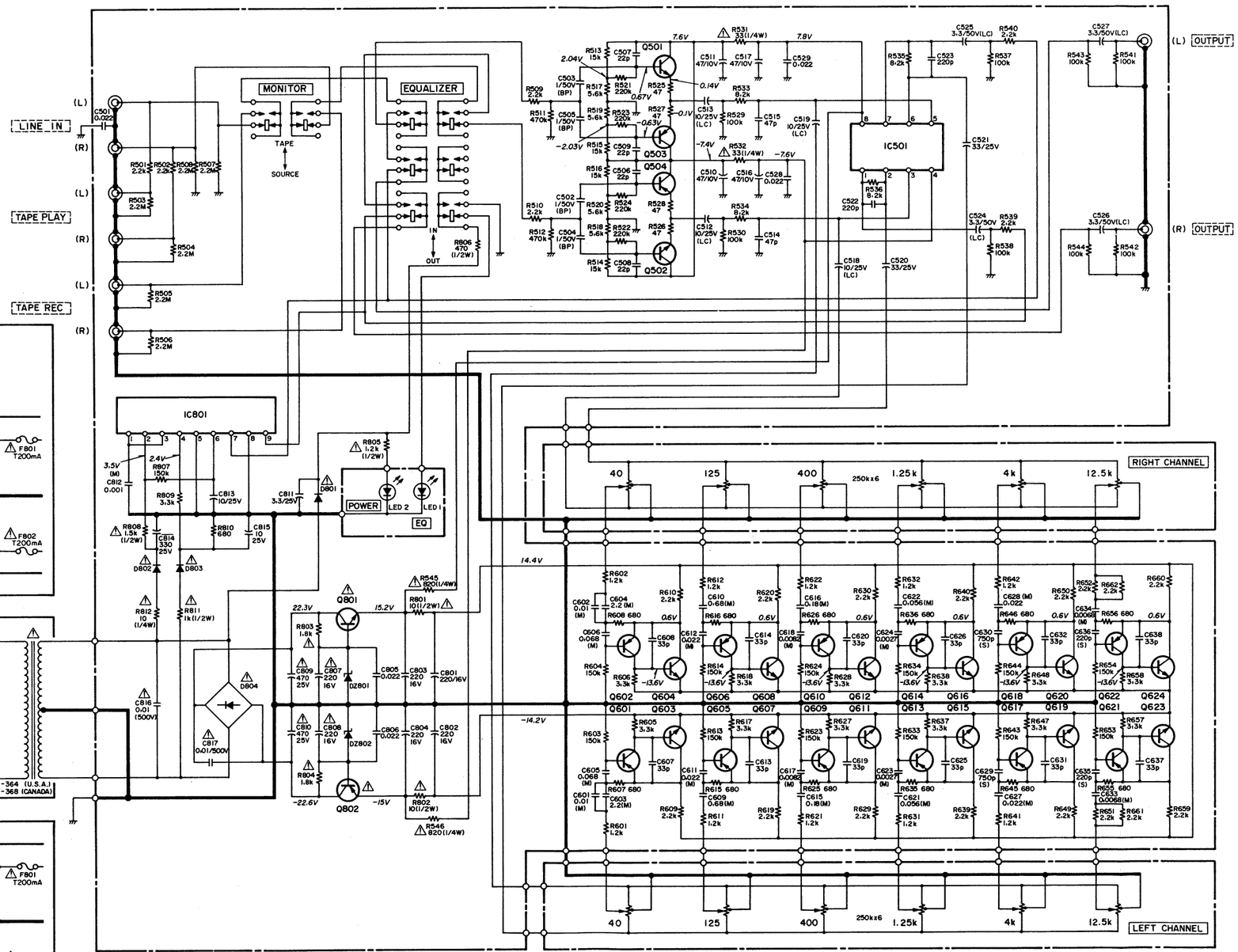
TEAC CORPORATION	3-7-3 NAKA-CHO MUSASHINO TOKYO PHONE (0422) 53-1111
TEAC CORPORATION OF AMERICA	7733 TELEGRAPH ROAD MONTEBELLO CALIFORNIA 90640 PHONE (213) 726-0303
TEAC AUSTRALIA PTY., LTD.	115 WHITEMAN STREET SOUTH MELBOURNE VICTORIA 3205 PHONE 699-6000

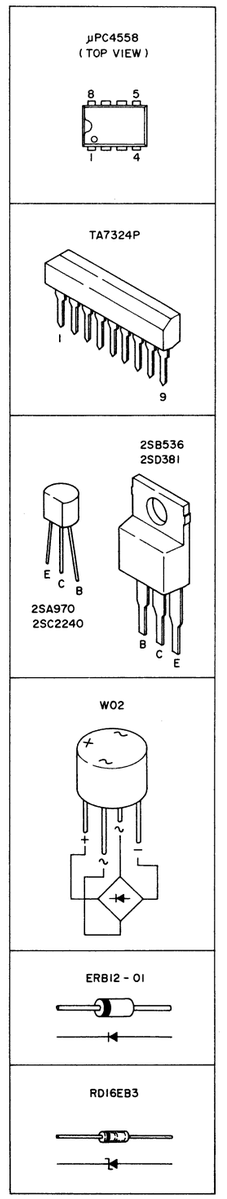
PRINTED IN JAPAN 0182GEN0.85 D-3952A

TEAC SCHEMATIC DIAGRAM

IC501	µPC4558
IC801	TA7324P
Q501/Q502	2SC2240
Q503/Q504	2SA970
Q601/Q602	2SA970
Q603/Q604	2SC2240
Q605/Q606	2SA970
Q607/Q608	2SC2240
Q609/Q610	2SA970
Q611/Q612	2SC2240
Q613/Q614	2SA970
Q615/Q616	2SC2240
Q617/Q618	2SA970
Q619/Q620	2SC2240
Q621/Q622	2SA970
Q623/Q624	2SC2240
Q801	2SD381
Q802	2SB536
D801	ERB12-01
D802	ERB12-01
D803	ERB12-01
D804	W02
ZD801	RD16EB3
ZD802	RD16EB3







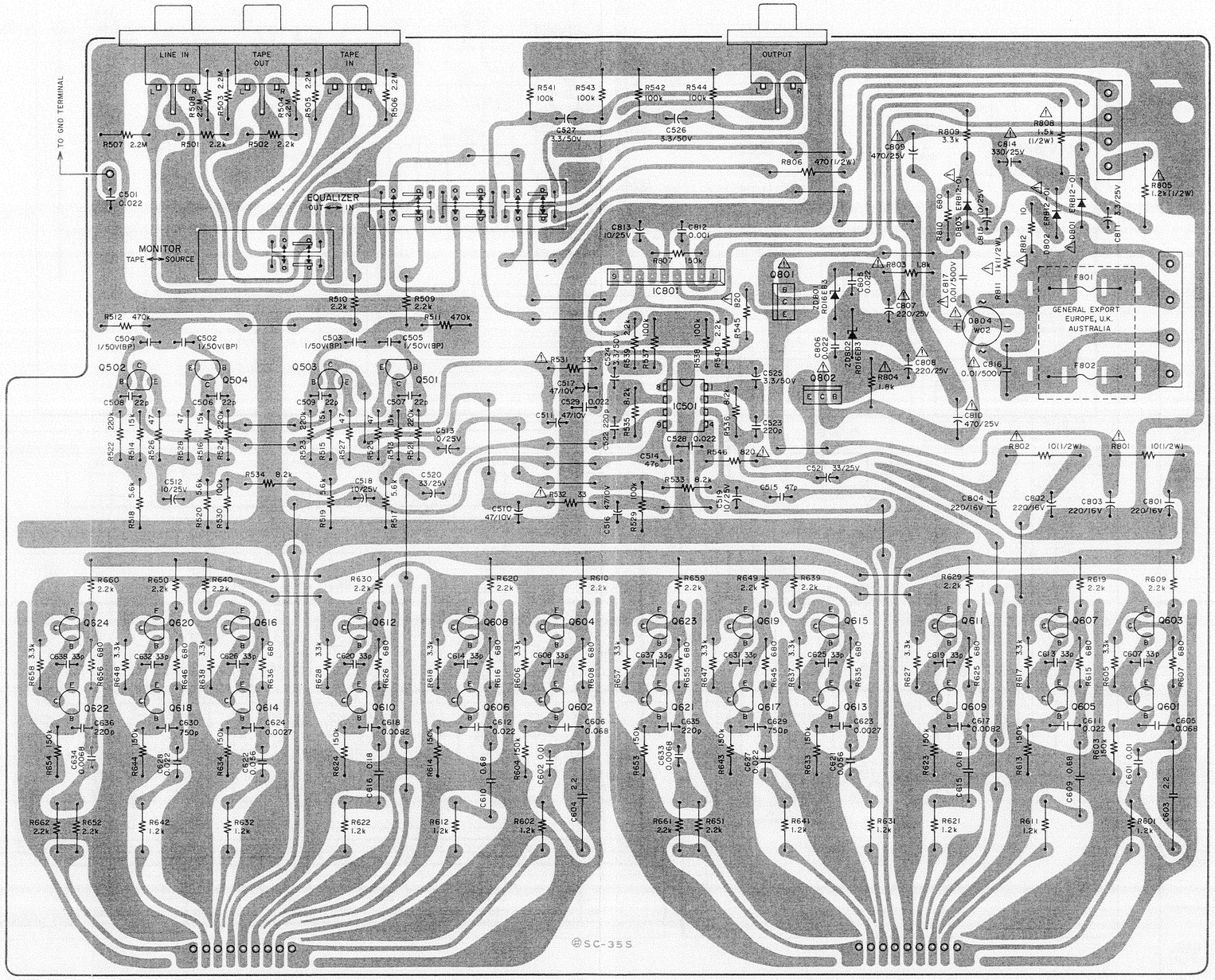
NOTES

1. All resistors are ¼ watt, ±5%, unless otherwise noted.
   Resistor values are in ohms (k = kilo-ohms, M = mega-ohms).
2. All capacitor values are in microfarads (p = pico-farads).
3. Voltages are measured to chassis ground with a "DC VOLTMETER".

GE-6 Graphic Equalizer

PC BOARD

EQ/POWER SUPPLY PCB ASSY



NOTES

1. All resistors are ¼ watt, ±5%, unless otherwise noted.
   Resistor values are in ohms (k = kilo-ohms, M = mega-ohms).
2. All capacitor varues are in microfarads (p = pico-farads).
3. PC board shown are viewed from foil side.